

**REMARKS**

Applicants appreciate the continued examination of the present application as evidenced by the Office Action of September 18, 2008 (the "Action").

The Action rejects Claims 1-4, 6-10, 14-16, 18, 20 and 33 under 35 U.S.C. 103(a) as being unpatentable over U.S. Publication No. 20020197789 to Buchanan et al ("Buchanan") in view of Lim et al., "Dielectric Functions and Optical Bandgaps of High-K Dielectrics for Metal-Oxide-Semiconductor Field-Effect Transistors by Far Ultraviolet Spectroscopic Ellipsometry," Journal of Applied Physics, Volume: 91, No. 7, pp 4500-4505, April 1, 2002 ("Lim").

In response, Applicants have amended Claim 1 to recite that B is an element of the transition metal elements of groups IVB or VB of the periodic table. Applicants have amended Claims 7-9 for consistency with amended Claim 1.

Reconsideration is respectfully requested in view of the above amendments and the remarks that follow.

Independent Claim 1 recites a semiconductor device including:

a semiconductor substrate;  
a first oxide layer on the semiconductor substrate, the first oxide layer comprising an element from the semiconductor substrate;  
a second oxide layer on the first oxide layer opposite the semiconductor substrate, the second oxide layer comprising a stoichiometric, single-phase complex oxide represented by the formula:

$A_hB_jO_k$ , or equivalently  $(A_mO_n)_a(B_qO_r)_b$   
in which the elemental oxide components,  $(A_mO_n)$  and  $(B_qO_r)$  are combined so that  $h = j$  or, equivalently,  $ma = bq$ , and  $a, b, h, j, k, m, n, q$  and  $r$  are non-zero integers; and  
wherein:

A is an element of the lanthanide rare earth elements of the periodic table or the trivalent elements from cerium to lutetium; and

B is an element of the transition metal elements of groups IVB or VB of the periodic table.

The Action takes the position that Buchanan teaches a semiconductor substrate with first and second oxide layers such that the second oxide layer includes a stoichiometric,

single-phase complex oxide represented by the formula ABO. See the Action, page 3. However, the Action concedes that Buchanan does not teach that h=j, or that A is an element for the lanthanide rare earth elements of the periodic table or the trivalent elements from cerium to lutetium, and B is an element of the transition metal elements of groups IIIB, IVB or VB of the periodic table.

Applicants note that Buchanan identifies perovskite-type oxides according to a formula in which A is a cation having a positive formal charge of from about 1 to about 3 and B is a metal. It is noted that the specific examples of perovskite-type oxides provided in paragraph [0047] of Buchanan do not satisfy the equation recited in Claim 1, *i.e.*,  $A_hB_jO_k$ , or equivalently  $(A_mO_n)_a(B_qO_r)_b$  where A is an element of the lanthanide rare earth elements of the periodic table or the trivalent elements from cerium to lutetium, and B is an element of the transition metal elements of groups IVB or VB of the periodic table. Therefore, Buchanan clearly does not disclose the recited the equation recited in Claim 1, *i.e.*,  $A_hB_jO_k$ , or equivalently  $(A_mO_n)_a(B_qO_r)_b$  as further conceded in the Action.

Lim discusses the single crystal optical properties of high-*K* dielectrics including  $GdScO_3$  and  $SmScO_3$ . However,  $GdScO_3$  and  $SmScO_3$  also do not satisfy the equation recited in Claim 1 as amended. Although gadolinium (Gd) and samarium (Sm) are lanthanide rare earth elements, scandium (Sc) is a member of the Group IIIB transition metal elements. Therefore, Lim does not discloses that B is an element of the transition metal elements of groups IVB or VB of the periodic table as recited in amended Claim 1.

Moreover, Lim does not disclose or suggest a generalized formula for high-*K* dielectrics, and Lim does not provide any apparent reason or guidance to select other elements. Therefore, Lim does not disclose or render obvious that B is an element of the transition metal elements of group IVB or VB of the periodic table as recited in Claim 1.

For at least these reasons, Applicants submit that the recitations of Claim 1 are not disclosed or rendered obvious by the combination of Buchanan and Lim. Claims 2-4, 6-10, 14-16, 18, 20 and 33 depend from Claim 1 and are likewise patentable over the cited prior art. Applicants respectfully request that the rejections under 35 U.S.C. 103(a) be withdrawn.

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**CONCLUSION**

For at least the reasons discussed above, Applicants submit that the pending claims are in condition for allowance.

Respectfully submitted,



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